

Trí tuệ nhân tạo trong điều khiển



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Coronavirus: How Artificial Intelligence, Data Science And Technology Is Used To Fight The Pandemic



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Enterprise Tech

CORONAVIRUS, COVID-19, 2019-NGOV, COVID-19

How to Fight the Coronavirus with AI and Data Science

WHO, BlueDot Global, and Harvard Medical School leading the way to disease prevention



David Yakobovitch

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Feb 16 • 9 min read ★



Source: <https://towardsdatascience.com/how-to-fight-the-coronavirus-with-ai-and-data-science-b3b701f8a08a>

<https://www.forbes.com/sites/bernardmarr/2020/03/13/coronavirus-how-artificial-intelligence-data-science-and-technology-is-used-to-fight-the-pandemic/#3e9f97315f5f>

Harvard Medical School is spearheading efforts to find solutions for the coronavirus by using machine learning technology to review data and information from various sources, including patient records, social media and public health data. As a result of a **natural language processing tool**, researchers at Harvard Medical School can search online information about the coronavirus and understand the current location of the outbreak. For example, NLP is aiding in distinguishing between people complaining about coronavirus symptoms and those discussing about the disease but not affected. According to the HMS, the patterns in online media can facilitate discovery of a location outbreak and promote increased awareness on potential solutions.

BlueDot is one AI start-up that has developed **intelligent systems that sift through data** about people to determine the chances of disease occurrence. The AI platform from BlueDot is among the latest technological advances using data analytics to map and prevent diseases. Something quite interesting is that BlueDot predicted the SARS pandemic and turned out to be true. The SARS outbreak came with devastating effects and claimed the lives of almost 1,000 people. The outbreak alert about the Coronavirus on December 2019 is another evidence attesting to the powerful nature of AI technology. This later came true as the outbreak became mainstream on February 2nd, 2020.

Natural language processing (NLP) is one tool used by BlueDot to track diseases with the company being successful in detecting diseases around the globe. For instance, BlueDot analyzes human languages around the world and use the information to assist them forecast disease outbreaks. Machine learning is another technology used by BlueDot with the algorithms offering updated information about possible disease occurrences. Nevertheless, the #AI technology at BlueDot saves time and resources by empowering health professionals with information on prevention measures. Often times, disease prevention poses threats compared to predicting and thanks to the machine learning tools, health specialists focus on patient safety.

Insilico Medicine is another start-up focused on using analytics in disease prevention. Based in Maryland, USA, Insilico Medicine is currently developing technology that will inform doctors about molecules capable of fighting against the coronavirus. The AI system at Insilico Medicine is fast and accurate having recently analyzed molecules and provided feedback about molecules suited to counter the coronavirus. The start-up is currently developing a database of molecular information that medical researchers can use in their projects and more so combating deadly outbreaks including the coronavirus.

Google's DeepMind division used its latest AI algorithms and its computing power to understand the proteins that might make up the virus, and published the findings to help others develop treatments. BenevolentAI uses AI systems to build drugs that can fight the world's toughest diseases and is now helping support the efforts to treat coronavirus, the first time the company focused its product on infectious diseases. Within weeks of the outbreak, it used its predictive capabilities to propose existing drugs that might be useful.

Tencent operates WeChat, and people can access free online health consultation services through it. Chatbots have also been essential communication tools for service providers in the travel and tourism industry to keep travelers updated on the latest travel procedures and disruptions.

The cloud computing resources and supercomputers of several major tech companies such as Tencent, DiDi, and Huawei are being used by researchers to fast-track the development of a cure or vaccine for the virus. The speed these systems can run calculations and model solutions is much faster than standard computer processing.

In a global pandemic such as COVID-19, technology, artificial intelligence, and data science have become critical to helping societies effectively deal with the outbreak.

Coronavirus: Chinese supercomputer uses artificial intelligence to diagnose patients from chest scans

- System analyses hundreds of images in seconds then advises doctors what to do next
- China has offered free use of the machine around the world but US Centres for Disease Control says it does not recommend using scans to diagnose Covid-19



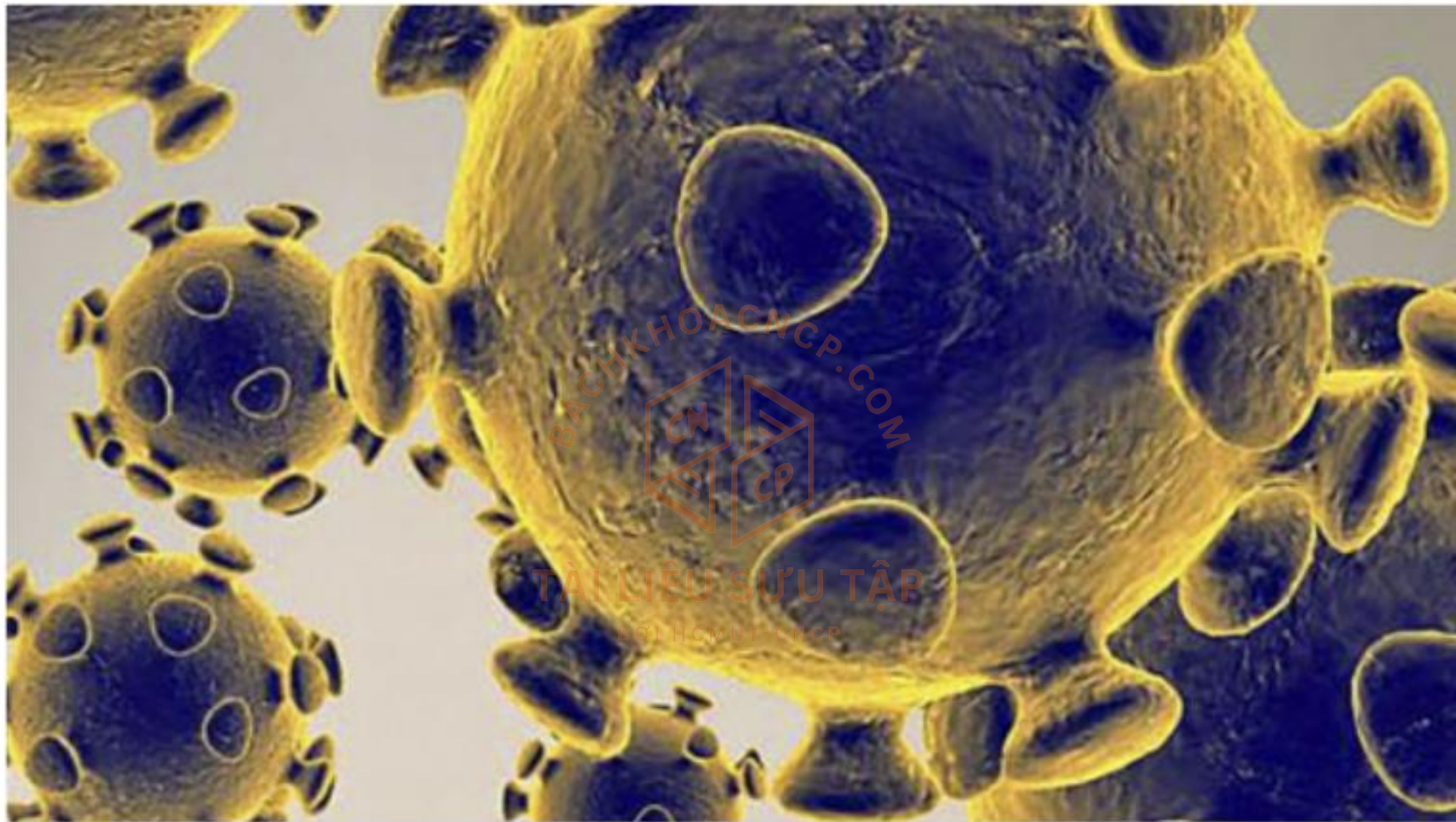
Stephen Chen in Beijing

Published: 11:00pm, 13 Mar, 2020

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Source: South China Morning Post

<https://www.scmp.com/news/china/society/article/3075153/coronavirus-chinese-supercomputer-uses-artificial-intelligence>



System analyses hundreds of images in seconds, then advises doctors what to do next. China has offered free use of the machine around the world, but US Centres for Disease Control says it does not recommend using scans to diagnose Covid-19. — SCMP

A supercomputer in China offers doctors around the world free access to an **artificial intelligence** diagnostic tool for early identification of **Covid-19** patients based on a chest scan.

The AI system on the Tianhe-1 computer can go through hundreds of images generated by computed tomography (CT) and gave a diagnosis in about 10 seconds, according to the National Supercomputer Centre in Tianjin, which hosts the machine.

An employee at the facility said the results could then be used to help medical professionals – especially those in areas that have limited test kits or are hit by a sudden increase in suspected cases – to quickly distinguish between patients infected with the novel coronavirus and those with common pneumonia or another illness.

The accuracy of the analysis was higher than 80% “and increasing steadily every day”, he said.

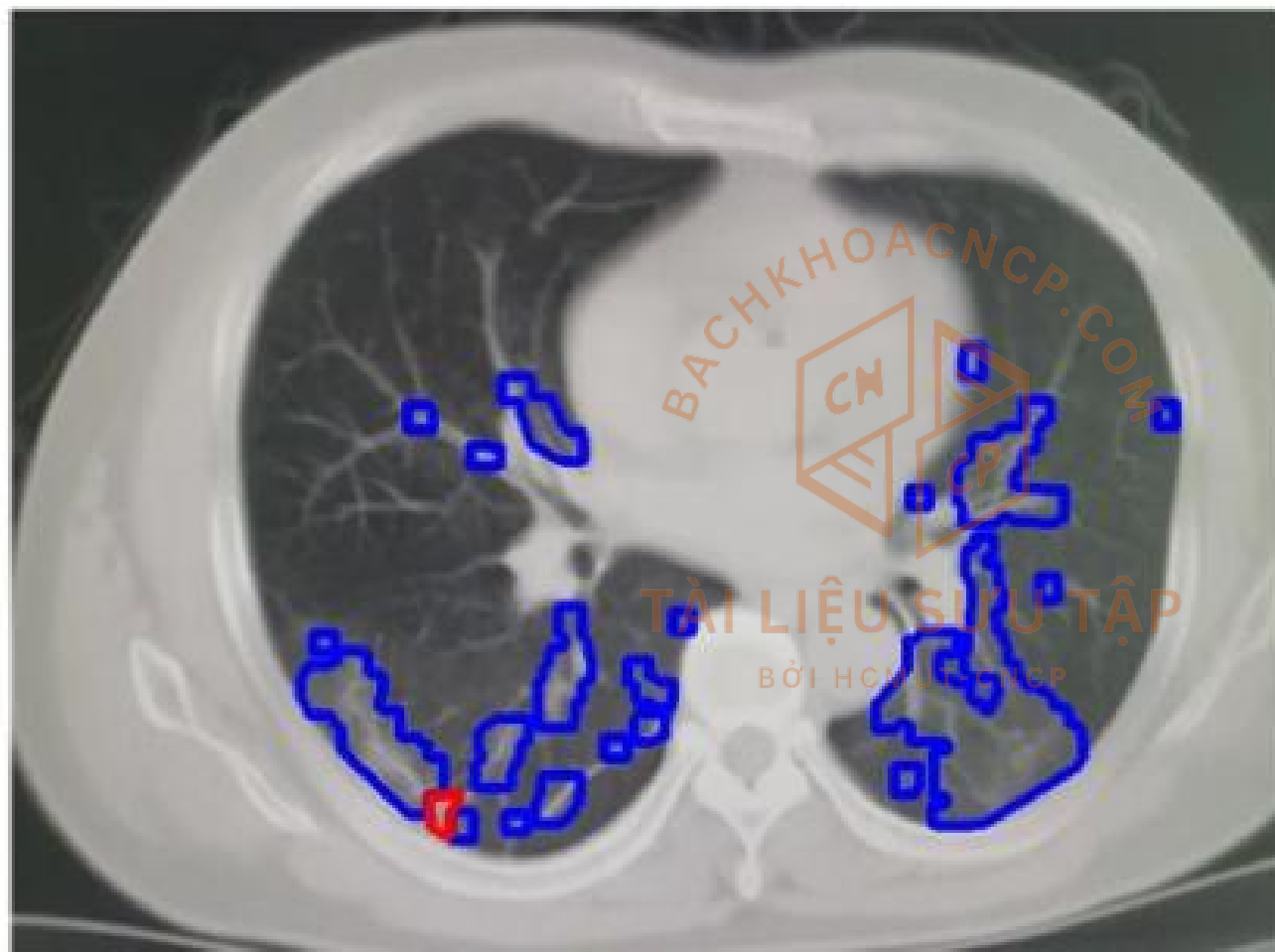
The system has an English interface and the reports it produces direct doctors to those areas of the patient's lungs that require special attention by circling them in different colours.

It also provides an estimate of the likelihood of the person having contracted Covid-19, in a range from zero to 10, with lower numbers suggesting a higher probability of infection.

It even advises on what to do next, based on the experiences and lessons learned from doctors who have treated coronavirus patients.

Dr Xu Bo, a lead scientist on the project at Tianjin Medical University, said in an interview this week with *Science and Technology Daily* that the accuracy of the system was initially "rather poor".

But the team worked round the clock to train the machine using the latest information from doctors with experience of Covid-19 and their clinical practices, he said.



Submit

Status

Completed

Result

Image Feature

High probability of pneumonia, large-area ground glass mass ch
At the same time, there are obvious features of paving stones
possibility of covid-2019.

Deep Learning

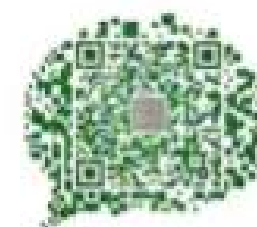
covid-19High probability. Feature value: 0.(Generally between 0-
the feature difference.)

Suggestion

The image shows features of Covid-19, and a comprehensiv
combination with epidemiological information and oth

Supplementary materials for improving model

Notes: This platform serves as a scientific research assistant analysis system, the result
combine clinical and other means to analyse the diagnosis for a more accurate con-
clusion will help us improve the model. This system is completely open access, and
patients, if you have any questions, please feel free to contact



As the number of samples increased, the AI's performance improved significantly, and is now helping medical teams fighting the coronavirus in more than 30 hospitals in Wuhan and other cities.

Xu said that it would take an experienced doctor about 15 minutes to go through the 300 images generated by a CT scan, while the AI did the job in about 10 seconds.

The system could be accessed via a computer or even a mobile phone, he said.

The use of chest scans for diagnosis was first proposed by doctors fighting the Covid-19 epidemic in Wuhan. After the city went into lockdown, a large number of suspected patients appeared and testing them for infection using genetic methods took from several hours to several days. Many people are thought to have died while waiting for their results to come back.

CORONAVIRUS

Alibaba says AI can identify coronavirus infections with 96% accuracy

New algorithm can complete disease recognition process within 20
seconds

SUN HENAN, KrASIA
FEBRUARY 19, 2020 22:47 JST

Source: <https://asia.nikkei.com/Spotlight/Coronavirus/Alibaba-says-AI-can-identify-coronavirus-infections-with-96-accuracy>

BEIJING -- A new AI-powered diagnosis system promises to detect new coronavirus cases with an accuracy rate of up to 96% via computerized tomography scans, Chinese tech outlet Sina Tech News reported.

The diagnosis algorithm was developed by Alibaba's research institute Damo Academy. Researchers at the academy said they had trained the AI model with sample data from more than 5,000 confirmed cases, adding that the system could identify differences in CT scans between patients infected with the novel virus and those with ordinary viral pneumonia with an accuracy of up to 96%. The algorithm included the latest treatment guidelines and recently published research, said its creators.

The new diagnostic tool was first introduced in the new Qiboshan Hospital in Zhengzhou, Henan province, which was modeled on Beijing's Xiaotangshan Hospital, completed in 2003 to deal with the SARS crisis. The new hospital started accepting patients infected with coronavirus on Sunday.

Kaggle Released CORD-19 — an AI Challenge on the COVID-19

Find out the key tasks that AI can help address in this international crisis.



Yong Cui, Ph.D. [Follow](#)

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Source: <https://towardsdatascience.com/kaggle-released-cord-19-an-ai-challenge-on-the-covid-19-50d657378ff4>

To help address this problem, researchers and leaders from the leading AI institutes, including Allen Institute for AI and Microsoft, and the federal government agency (i.e., the National Library of Medicine) have teamed together with extensive collaboration, resulting in the release of the COVID-19 Open Research Dataset (CORD-19) of scholarly literature about COVID-19, SARS-CoV-2, and other kinds of coronavirus.

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Major Collaborators for The CORD-19 Data Assembly

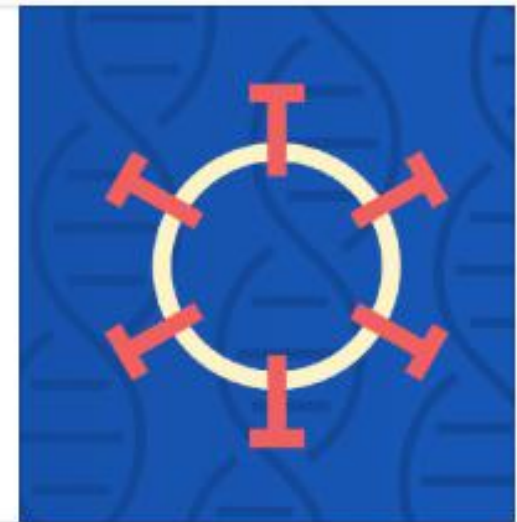
Kaggle & CORD-19

This dataset is available on the Kaggle's website, which is publicly accessible to any AI researchers through the link below. Researchers in the AI world can't be unfamiliar with Kaggle — an online community of data scientists and machine learning researchers.

COVID-19 Open Research Dataset Challenge (CORD-19)

An AI challenge with AI2, CZI, MSR, Georgetown, NIH & The White House

www.kaggle.com



The CORD-19 dataset consists **over 29,000 articles, among which 13,000 have full text**. All of these articles are related to the study of coronavirus, such as case reports, transmission routines, environmental factors, and treatment strategy explorations. However, not all of these articles aren't machine-readable such that it's hard to utilize AI tools to extract useful information for us to battle this infectious disease.

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Fortunately, researchers from the Allen Institute for AI worked hard and helped AI researchers transform the content of this enormous size of literature into *machine-readable form*, which makes it possible for data and text mining using a machine learning approach.

Key Scientific Questions

The Standing Committee on Emerging Infectious Disease and 21st Century Health Threats of the US NASEM and the WHO identified 10 scientific questions that are vital to address this international crisis.

These questions include studying the transmission and incubation of the virus, risk factors for getting the COVID-19, the origin of the virus, and the proper medical practice for treating this disease.

The full list of the challenge's tasks are available on Kaggle's website.